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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/811,408

03/26/2004

David H. Stark

STRK-26,696

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EXAMINER

LAZORCIK, JASON L

ART UNIT

PAPER NUMBER

1731

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DELIVERY MODE

06/29/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/811,408

Applicant(s)

STARK, DAVID H.

Examiner

Jason L. Lazorcik

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-18 and 21-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-18 and 21-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>4/17/2007</u> . | 6) <input type="checkbox"/> Other: _____ |

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 13-18 and 21-23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

In Claim 13, Applicant broadly requires that the at least one of the tensile strength, impact resistance, and environmental resistance of the inner "strength-reinforced transparent material" is "significantly" greater than the outer windowpane sheet materials. These limitations are individually reiterated in dependent claims 21, 22, and 23. First, it is the Examiners understanding that the values both of impact resistance and tensile strength will vary substantially dependent upon the specific details of the test procedure and upon the processing history of the individual materials (e.g. tempering conditions). Further, Applicant has provided only the broadest and indefinite guidance for the claimed "environmental resistance". Since Applicant has failed to provide any guidance regarding the details of the materials of construction of the assembly or the nature of the testing procedures or any preferred embodiments detailing said materials or conditions, one having an ordinary level of skill would not

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reasonably be able to make or reproduce Applicants experiment without significant and undue experimentation.

Claims 17 and 18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

With respect to Claims 17 and 18, Applicants specification as originally filed states that "the bonding temperature should be below the glass transition temperature, TG, and the softening temperature, TS, of both the window pane and strength-reinforcing materials". Applicants current claim however requires that "the respective temperatures...each remains below" the corresponding TS or TG "of the respective materials from which the respective sheets is formed". The current limitation provides for multiple "respective" temperatures within the laminate during the heating of the junction which is clearly not supported by the specification reference to "the bonding temperature".

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 12-18 and 21-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Specifically, Claims 13 and 21-23 recite the term "significantly greater" 13 and lines 2, respectively. The term "significantly greater" is a relative term which renders the claim indefinite. The term "significantly greater" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

With respect to claims 13 and 23 which recite the term "environmental resistance", Applicant has failed to provide any guidance or examples to clarify the particular metes and bounds for what is encompassed by said term. The intended metes and bounds of this term are unclear even when viewed in light of the specification, and therefore the particular metes and bounds for which Applicant seeks patent protection are likewise rendered unclear and indefinite.

Further, claims 13, 21 and 22 require that the impact resistance (claims 13, 21) and Tensile strengths (claim 13, 22) of the strength-reinforced sheet material be "significantly greater" than the window pane sheets materials, however it is the Examiners understanding that the values both of impact resistance and tensile strength will vary substantially dependent upon the specific details of the test procedure and upon the processing history of the individual materials (e.g. tempering conditions). Given the expected variability and lack of guidance provided by the specification, the

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particular metes and bounds for which Applicant seeks patent protection are rendered unclear and indefinite.

The terms "high pH" and "low pH" in claim 23 are relative terms which render the claim indefinite. The term "high" and "low" are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 13, 14, and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by martin (US 3,410,674) in view of Thorton et al. (from "Lead: the facts", Chapter 3, (2001), pg) where the latter is applied strictly as a teaching of the inherent properties of PbO containing glass.

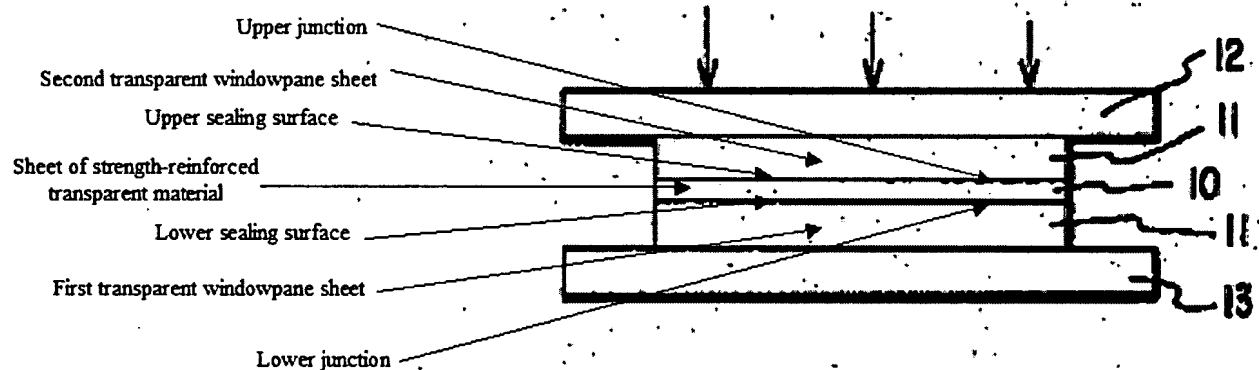
Briefly, Martin teaches a method of forming a seal between sheets of glass by application of elevated temperature and pressure to make a laminate structure.

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With respect to claim 13 and with particular attention to the reference figure 2 annotated to reflect the applicants chosen lexicon, Martin teaches the following;

1. Providing a sheet of devitrified glass (Column 4, Lines 41- 52) or a "sheet of strength-reinforced transparent material" with upper and lower sealing surfaces as indicated in the figure.
2. Providing first and second transparent windowpane sheets or "Pre-formed bodies of low expansion glasses" disposed in relation to the sheet of devitrified glass in such manner as to produce an upper junction and a lower junction as claimed
3. Applying a predetermined contact pressure at a predetermined temperature (column 4, lines 11-17) in order to achieve a seal or "a diffusion bond" between the first and second transparent windowpane sheets and the devitrified sheet. It is here noted that due to the laminate structure, the central layer of "strength-reinforced material", which is flanked by and protected by the tow outer layers of windowpane sheet material, would reasonably be expected to be more abrasion resistant than the either of said outer layers.

FIG. 2



Regarding Applicants newly added limitations, that the materials of construction for layers 10 and 11 in the Martin reference inherently have a tensile strength an impact resistance, and an environmental resistance. As pointed out in Applicants reply filed April 17, 2007, Martin teaches that in a preferred embodiment the layer (10) comprises a lead borosilicate glass comprising 60 to 80% PbO (Column 2, Lines 46-59). To this end, Thorton teaches "lead oxide has been added to glasses and glazes since ancient times" (pg37) and that "lead additions give excellent (radiation) shielding properties to glass" (pg 39). From at least the Thorton disclosure, it is understood that the PbO containing glass would be expected to present a "significantly greater" environmental resistance at least to x-ray and gamma ray emissions.

Regarding claim 14, Martin teaches that pressure is applied by inserting the assembly between platens (12) and (13) followed by applying heat by inductive means or by insertion of the apparatus into a furnace (Column 4, lines 34-40). This disclosure is

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read as a method wherein the step of pressing is performed before the step of heating as claimed.

With respect to Claim 16, Martin teaches that the assembly of 10 and 11 is subjected to heat and pressure to complete the seal". Where the immediate disclosure is read as providing both heat and pressure upon the assembly at the same time, said disclosure is read in the immediate claim as a process wherein the steps of pressing the windowpane sheets against the sheet of strength-reinforced material and of heating the junctions are performed simultaneously".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Martin (US 3,410,674) as applied in the rejection of claim 13 under 35 USC 102(b) above. Martin fails to explicitly set forth a scenario wherein the laminate comprising the two preform sheets (11) and a devitrified interlayer (10) is heated first followed by a pressing step to complete the bonding process. The reference does teach scenarios wherein the laminate is first pressed followed by application of heat to effect a bond and indicates that both heat and pressure are applied simultaneously to effect a satisfactory bond. In light of these disclosures and ***in the absence of any unexpected results***, it would have been obvious to one of ordinary skill in the art at the time of the invention to carry out the steps of heating and applying pressure ***in any order*** which produces an effective bond between the elements of the laminate.

Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Martin (US 3,410,674) as applied to claim 13 above, and in further view of the general teachings on the physical properties of Pyrex borosilicate glass (<http://en.wikipedia.org/wiki/Pyrex>) and the general teachings set forth by Bayrashev et. al. (Sensors and Actuators A: Physical, Volume 103, Issues 1-2, 15 January 2003, Pages 16-22).

With respect to Claim 17 and Claim 18, Martin teaches that the layer (10) of “strength reinforced transparent material” preferably makes use of “thermally devitrifiable glasses ... of a type which upon thermal treatment are converted to the crystalline state” and that “the remaining glassy phase ... is sufficient to form a normal

fusion bond or seal with the sealing surface under pressure at temperatures well below the original curing temperature of the glass." Although Martin does not explicitly limit the processing temperatures to be below the glass transition temperature of the strength reinforced material, the instant reference to operating in a temperature range that promotes crystallization and at "well below" the original curing temperature strongly implies the thermally benign operating conditions were contemplated by the reference.

Further, Martin teaches in Example 1 that the preformed body in the assembly discussed in the rejection of Claim 13 above is formed of a hard, low expansion borosilicate glass having the identified compositional ratios. The reference indicates that when utilizing a borosilicate glass, the laminate assembly is heated to 525°C to yield an effective fusion bond (Column 5, Lines 23-26). Since the reference does not teach a particular borosilicate composition, Martin is silent regarding either the glass transition temperature or the softening temperature of the borosilicate glass used in this specific example.

Pyrex brand borosilicate glass is a well known low coefficient of expansion glass. Given the wide industrial use of this particular formula of glass, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the commonly available Pyrex brand borosilicate glass for the pre-formed borosilicate bodies in the laminate structure as described in Example 1 of the Martin reference. Where the softening point of Pyrex is indicated to be 821°C (pg2, line 3 of <http://en.wikipedia.org/wiki/Pyrex>) and the glass transition temperature is identified as 600°C (pg 21, column 2, paragraph 2 of Bayrashev et. al.), the Martin process utilizing

Pyrex borosilicate glass and heated as set forth in Example 1 to 525°C would be carried out below **both** the glass transition temperature (TG) and the softening temperature (TS) of the Pyrex sheets as claimed.

Regarding Claim 17, the Martin process utilizing Pyrex brand borosilicate glass as set forth above is understood to describe a process "wherein during the step of heating the junctions, the temperature of the sheets remains below the glass transition temperature (TG) of the respective materials from which the sheets are formed."

Regarding Claim 18, the Martin process utilizing Pyrex brand borosilicate glass as set forth above is understood to describe a process "wherein during the step of heating the junctions, the temperature of the sheets remains below the softening temperature (TS) of the respective materials from which the sheets are formed."

In view of the foregoing discussion, it would have been obvious for one having no more than an ordinary level of skill in the art at the time of the invention to optimize the material processing temperature through routine experimentation. One of ordinary skill would recognize a lower temperature range below which an effective bond does not form and an upper temperature limit dictated at least in part by higher equipment investment costs and elevated operating costs. Although the instant reference stops short of requiring operating conditions below TG, the above citations at least indicate that such operating conditions are not excluded by the Martin reference.

Therefore, absent any compelling and unexpected results to the contrary, an operational temperature below the "glass transition temperature" of each of the constituent laminate materials would have presented a merely obvious modification over

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Martin for one of ordinary skill. Specifically, operating in the claimed temperature range would have been obvious since lower processing temperatures present both lower operating costs and operating below the TG would be expected to minimize physical deformation of the laminate.

Claims 21-22 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Martin (US 3,410,674) as applied above to claim 13.

It is well appreciated in the glass manufacturing art that the tensile strength and the impact resistance of a material are intimately related to the particular processing history of a glass material. Specifically, it is well known that by tempering a heated glass sheet the glass tensile strength (and thereby the impact resistance) can be enhanced by imparting compressive stress in the outer layers of said glass. One of ordinary skill would recognize that a tempering operation of this type would differentially affect individual layers in a laminate glass structure consisting of different glass materials. Therefore, although not explicitly disclosed by the Martin reference, it is the Examiners position that one having an ordinary level of skill in the glass processing art would have been fully capable of determining the appropriate tempering conditions to achieve the desired tensile strength and impact resistance within the laminate materials. Absent any compelling and substantially unexpected results to the contrary, this would have been a merely routine experimental undertaking for one of ordinary skill seeking to optimize the physical properties of the resultant laminate structure.

Response to Arguments

Applicant's arguments filed April 17, 2007 have been fully considered but they are not persuasive.

Applicant argues that the interlayer of Martin "may be characterized as being weaker and less durable than high silica glasses such as the borosilicate used for the perform bodies of Martin". Applicant then cites fracture toughness values for several glass compositions from the Varshneya reference and concludes that the interlayer (10) in Martin must necessarily not exhibit "significantly greater tensile strength, impact resistance or environmental resistance" than the borosilicate glass.

Examiner strongly disagrees.

It is first noted that Applicant acknowledges the cited composition for fracture toughness (e.g. 61% PbO, 35% SiO₂ and 4%Na₂O) is NOT equivalent to the Martin compositions. In view of this fact, Applicants conclusions based upon the Varshneya reference are held to be mere conjecture, NOT evidence, and are therefore held moot.

Second, the Varshneya reference (pg 444, §18.12) explicitly and unambiguously states that "the reader should understand the difference between strength and toughness". The reference specifically teaches that fracture toughness is a measure of the area under the stress strain curve while tensile strength is the stress at material failure. Varshneya further teaches that (see bullet 4) introducing compression in the surface (e.g. tempering) is one method for increasing the strength of a glass. From this

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it follows that strength and impact resistance are highly dependent upon the processing history of the glass body.

To restate, Applicants own reference underscores the fact that "fracture toughness" is not equivalent to "Tensile strength". It is unclear how the values listed in Varshneya table 18-1 relating to fracture toughness apply to the issue at hand. It follows that Applicants argument wherein "it must be concluded that the sheet of sealing glass disclosed in Martin would not exhibit significantly greater tensile strength or impact resistance" is fatally flawed.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason L. Lazorcik whose telephone number is (571)


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272-2217. The examiner can normally be reached on Monday through Friday 8:30 am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571) 272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JLL


STEVEN P. GRIFFIN
PRIMARY EXAMINER
A01731